The Nature Conservancy
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The Nature Conservancy of Utah
559 East South Temple
Salt Lake City, UT 84102

tel [801] 531.0999
fax [801] 531.1003
nature.org

(Mary Ann Req FYI
Route Susan
Wayne
→ Kuc Sile (last)
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NATURAL RESOURCES

Dr. Dianne Nielson, Director
Utah Department of Environmental Quality
168 North 1950 West
Salt Lake City, UT 84114-4840

Dear Dr. Nielson:

The Nature Conservancy is submitting the following comments for public record in regard to Kennecott Utah Copper's groundwater remediation project. We appreciate the many opportunities that you and Kennecott have provided to discuss this project in more detail and especially thank Doug Bacon, John Cherry and Dr. Bill Adams for the time they spent with us.

Based upon more than twenty years of experience with wetlands conservation at the Great Salt Lake, and being the owner/manager of a major wetland preserve in Farmington Bay, The Nature Conservancy has strong concerns and questions about the project, particularly the method of disposal of concentrates from the groundwater remediation project.

As you will read below, most of our concerns stem from the fact that we just do not know how best to proceed with decision-making because there has never been a comprehensive and independent study of the whole Great Salt Lake system and no solid scientific determination of what key contaminant thresholds are important for proper system functioning. Absent such study, it is impossible to set anything other than arbitrary standards for the system. Certainly, our growing need to identify clean water sources and to protect the natural environment of the Great Salt Lake for human as well as wildlife values dictate that the State of Utah take immediate steps to put in place a comprehensive management and monitoring plan for the entire lake system. The Nature Conservancy would be a strong advocate in all arenas for the design and funding of such an effort.

Our concerns include:

- The absence of recognition of the incalculable importance of the Great Salt Lake system to wildlife and the people of Utah. The Jordan River, its diversions and delta are critical to the health of the Great Salt Lake wetlands and the lake's

hemispherically-renowned numbers of migratory birds. These values demand that decisions we make will not impair the lake system. We now seem to be willing to downgrade this irreplaceable water body by accepting near-threshold pollution levels, approaching wildlife harm and mortality.

- The lack of an assessment program to evaluate in advance the propensity for materials to accumulate in these types of depositional environments. We are concerned that the current criteria have not been fully and properly studied from a system perspective; thus leading to our further concern regarding the application of such current criteria to Kennecott's remediation project in the absence of established system wide numerical standards. The state has not definitively answered the question as to the current possible pollution status of Farmington Bay – a question that should be answered before additional pollutants are added. In the absence of a system-wide assessment program, we do not believe that there is enough margin for error (.4ppb) to allow and account for probable dynamic river and lake changes over time.

- The lack of a scientifically-credible, peer-reviewed monitoring program to determine cumulative effects on the Great Salt Lake's water, wetland vegetation and wildlife. The design of such a program should be a joint effort of all potentially-affected parties. All Jordan River water does not end up in the lake, but also on agricultural lands, in mitigation banks, private wetlands. Specifically, we are concerned that monitoring only the water in the system may overlook critical effects to aquatic organisms, wetland vegetation, and millions of migratory birds. We are not sure that concentrates will be irrevocably "bound" by saline conditions or by just residing in the constantly-changing, dynamic lake system. It does not appear that a scientifically-credible monitoring plan is in place to test the theory that contaminants will be bioremediated or permanently sequestered by the lake.

- Who is ultimately responsible and liable if contamination problems occur during the 40+-year time period?

- Is this permit consistent with other state agency directives concerning management of the lake? (Does it conflict, for instance, with brine shrimp industry goals/policy or wildlife management directives?)

- The absence of numeric standards for the lake itself will contribute to continued controversy over questions of discharge of contaminants and other materials.

Our Recommendations

- ❑ Re-explore (with Kennecott and JVWCD) other alternatives to discharging into the Jordan River because of the potential risks to freshwater wetlands in the Jordan River Basin and to Farmington Bay of the Great Salt Lake

- ❑ Complete ongoing water quality study of Farmington Bay before adding additional contaminants.

- ❑ Design and implement a credible strategy that will result in the identification and adoption of numeric water quality standards for the lake body itself.

- ❑ Conduct an ecological risk assessment and conduct the necessary bioassays as an approach to answering the basic questions necessary for numerical water quality standards. Provide clear and measurable standards that are protective of the environment. The concentration of Selenium and other contaminants should be measured by the maximum concentration anywhere in the water body to which it contributes – not just the point of discharge.

- ❑ Establish a greater margin of error within the standards for protection of this dynamic environment.

- ❑ Clearly establish who will conduct (and pay for) monitoring, and establish the scope and scientific-credibility of the monitoring project. Such monitoring should include cumulative impacts to aquatic organisms, wetland vegetation and wildlife itself in the Jordan River and the Great Salt Lake as well as the agricultural lands, mitigation banks, duck clubs and preserved areas which also use the affected water. The monitoring time should be extended past the time of the pumping and disposing operation.

- ❑ Clearly establish who is accepting the environmental liability throughout the 40-year project period and beyond.

- ❑ Design and implement a more thorough method for handling mining wastes such as storage of such wastes in a secure containment facility to prevent future occurrences of contamination events.

- ❑ Confirm that the issuance of this permit does not conflict with the purpose and directives of other state agencies and resolve such conflicts to the extent such conflicts exist.

- ❑ Establish a state Great Salt Lake Ecosystem management entity – a body that would have the authority to coordinate all aspects of state responsibility for the lake as a whole system. This entity should be supported by adequate scientific information and consider management decisions in context with all other factors affecting the health of the Great Salt Lake.

I have attached as Exhibit 1 additional material supporting The Nature Conservancy of Utah's position on the important issues raised by the Kennecott discharge permit proposal. We look forward to continuing to discuss this important issue with you and key players in the coming months.

Again, thank you for the opportunity to comment on the project.

Sincerely,

John W. Milliken
Board Chair
The Nature Conservancy of Utah

Exhibit 1

I. Importance of the "Discharge Area" – Jordan River, Great Salt Lake, Wetlands and Wildlife

As you know, the environment encompassing all of the elements we collectively call the "Great Salt Lake"–wetlands, riparian systems, tremendously productive food resources that are beautifully timed to meet the demands of phenomenal populations of migratory and resident birds–has become increasingly important to us as a human population and community living in this landscape. The Great Salt Lake is arguably Utah's most important and diverse natural resource and "world class" in its importance to avian life. As we learn more about the complexity and irreplaceability of the lake, we are impressed with the magnitude of benefits to humans and wildlife when the lake's various ecosystems are properly functioning.

Integral to this landscape is the Jordan River and its delta. The Jordan River plays an important part in our environmental health, community enrichment and connectivity to the larger landscape. The river and its delta are habitat linkage for migratory birds moving through the valley and to the Great Salt Lake (Norvell, 1997). The State Water Plan for the Jordan River Basin clearly recognizes its outstanding qualities:

"The Jordan is reported to have been an excellent fishery in the early years following the first settlement of the valley. Since that time, the forest has been cut, the river channeled, the water polluted, the oxbows and wetlands filled, and much of the wildlife displaced. A considerable amount of pollution resulted from mining operations in both the Wasatch Front canyons and the Oquirrh Mountains. These mining activities have affected Jordan River quality since before the turn of the century and were at a peak from the early to middle part of this century... *Even though the Jordan River has been abused, it remains the backbone of the Salt Lake Valley's wildlife habitat resource. Recent efforts to preserve wetlands and riparian areas and to improve water quality bode well for wildlife (italics added).* The Jordan River Delta, a mosaic of marshes, ponds, wet meadows, and uplands along with privately and state developed wetlands, is a significant habitat resource."

Shared efforts to protect and restore Great Salt Lake ecosystems are receiving a great deal of community support. The decades-long effort to preserve the remaining wetlands on the lake has been shared by federal, state and private entities – with much success. Together, partners have protected thousands of acres of additional important wetland and upland habitat in Farmington Bay and elsewhere on the lake's eastern shore.

In Farmington Bay alone, land investment by TNC and partners totals over $12 million and has resulted in the establishment of the Great Salt Lake Shorelands Preserve - roughly 3,000 acres and nearly 12 shoreline miles of wetlands and uplands. The Nature Conservancy's recently-completed Visitors Facilities will be a recreational and educational focal point for Utahns for many years to come. We care very much about

protecting the natural lake system, our property and investment from future contamination.

The multiple values of the Great Salt Lake - spectacular numbers of birds and wildlife, productive extraction industries, recreational opportunities for Utahns - demand that we make decisions that will not impair the lake system.

II. Accumulation of Wastes, Assumption of Bioremediation and Dilution of Liability

A. "Where do the concentrates go?"

A primary concern is the issue of disposal of concentrated wastes, including metals--particularly selenium--into the Jordan River from the groundwater remediation project. We are alarmed that one area of pollution would be remediated and placed in another uncontained area, possibly jeopardizing the water and wetland environments of the Jordan River and Great Salt Lake. Kennecott and DEQ do not appear to be violating any specific laws in this project, but the material is being translocated into a sensitive natural area rather than being contained in a purposeful, secure facility.

The lake environment is a classic example of dynamic processes. Lake levels, wetlands, population dynamics of organisms and salinity levels are never constants in this environment. The fate of the metals cannot be predicted to simply be "in the Lake body" or "bound by highly saline conditions". There is a high degree of spatial heterogeneity of sediments and water chemistry in this site.

Because materials transported by rivers must ultimately come to rest, it can be expected that residual deposits of wastes will remain in place in the bed sediments of the Jordan River, moving along in entrained sediments in the river channel, in wetlands, on the depositional plain of the Jordan River Delta and along the variable lake shores. These sediments are further subject to movement - dispersal and concentration- during erosive events of high lake stages (Foote, 1991). This is a very dynamic system--salinity levels, lake levels, erosion and deposition, wetland types and locations, and on and on.

Accumulation of contaminants and pulses of their release, in response to various episodes of erosion, sediment transfer and re-deposition, are to be expected. It is highly probable that the continual placement of concentrates from the permeate facilities over a 40+-year timeframe into the Great Salt Lake wetlands will, at some future time, exceed water quality criteria for the protection of aquatic organisms.

In addition to the possibility of contaminants moving within the dynamic lake system, especially during episodes of high lake level (the 1980's for example), what happens

at extremely low lake levels (conditions today)? As Farmington Bay has receded, it has exposed and dried huge areas of formerly water-covered lakebed. These areas are now vulnerable to movement of lakebed materials through a little-studied mechanism – wind. Could contaminants residing at lake bed levels that are periodically exposed move by wind to adjacent wetland habitat areas? To metropolitan areas of the Wasatch Front?

Beyond aquatic organisms, we remain concerned about "other" places contaminants may accumulate. We would like to see a recognition by the state that there may be unknown possible health effects on wildlife and wetland vegetation. As stated earlier, we are concerned that contaminants might also be accumulating in wetland vegetation, wildlife and even the organisms residing in the lake body itself.

The concentrates may not be irrevocably "bound" by saline conditions or by just residing in the constantly-changing, dynamic lake system. Monitoring only the water in the system may overlook critical cumulative effects to aquatic organisms, wetland vegetation, and millions of migratory birds.

B. "It's diluted, it's meeting standards now...and, besides, it's in the lake."

If there is any belief, stated or implied, that the wetlands or Great Salt Lake brine is going to have a remedial effect upon the waste load put into the Jordan River from this project, then it is necessary to establish where, how and at what level selenium remediation is really occurring.

Even beginning with the assumption that the environment will take care of it–either by brine or wetland biogeochemical processes, one is lead to the need for a closer examination of the problem and outlining a formal, scientifically credible monitoring plan. An ecological risk assessment is an approach to answering these questions and provides something that can be measured (Lemly, et al., 2002).

A strong case can be made that not all the contaminated water actually does end up in the lake. The Jordan River is extensively diverted – for duck clubs, nature reserves, mitigation sites approved by the federal government for Salt Lake City and other private entities, and for agricultural use on the south shore. In low water years especially, a certain amount of Jordan River water never reaches the lake – but is put to beneficial use on agricultural and recreational lands. Whatever the water is carrying is and will be deposited at these sites with little or no scientifically-adequate monitoring.

It is our recommendation that the fate of the concentrates be actively pursued by DEQ with the studies necessary to inform the eventual process of developing numerical standards. No scientifically-credible monitoring plan is in place to test the theory that contaminants will be bioremediated or permanently sequestered by the

lake. All Jordan River water does not end up in the lake, but on agricultural lands, in mitigation banks, private wetlands – where it will concentrate annually due to evaporation. There appears to be no comprehensive monitoring is planned.

C. "If it's meeting standards today, who's monitoring accumulated levels and who's liable for possible damages within the 40-year timeframe?"

From the materials presented, we found it difficult to track the duration, scope and quality of a monitoring program, and pinpoint who is ultimately responsible for the fate of the concentrates. Who is legally liable if areas of the Jordan River, wetland areas and wildlife, or the lake body itself need to be remediated during or after the 40+ years of discharge. Ecological liabilities and responsibility for toxic hazards are not clearly addressed. If ultimately required, clean-up costs for systems as expansive as the Great Salt Lake's would be painfully expensive.

Monitoring is needed to look at timing, sources, concentrations, what the microbial remediation activity is doing to levels of selenium and other materials. Monitoring is needed to understand how selenium cycles to other forms and accumulates in the environment, and to evaluate the threat it may pose to fish and wildlife before deciding whether to proceed further. It's tenuous to assume the material disappears and is no longer biologically available. And monitoring only for water quality and not vegetation and wildlife impacts may miss a key cumulative result of the discharge. The lack of monitoring for this project is indicative of the lack of monitoring for the entire lake as to cumulative impacts of contaminant/pollution discharges from all inflow sources.

Who is ultimately responsible and liable if contamination problems occur during the 40+-year time period? Monitoring is a key element to assure environmental damage does not occur and/or is stopped once if damage is detected.

III. Water Quality Standards

The Utah Department of Natural Resources' Management Plan for the Great Salt Lake (under the authority of the Division of Forestry, Fire and State Lands) publicly states that: "The general policy is that, to the extent feasible, no pollutants (discharges) should be delivered to the lake in amounts that result in concentrations greater than those already present in the lake." Is this permit consistent with that directive?

Even assuming the discharge does meet current standards, the waste dilution point at 2600 South is not the endpoint of the metals or the end-effect on the environment. We are close to surpassing the concentration thresholds with this project's discharge levels. 4.6 parts per billion is currently being applied as the standard to protect

wildlife. The expected discharge is around 4.2 ppb. This is not an adequate margin of error in such a dynamic environment.

We have concerns and questions about "loading up the standards" on the Jordan River so closely to the threshold, considering the 40+-year timespan of the project. Looking ahead from this point in time until the end the project, we need to ask ourselves what the development patterns and water use will be in this 40-year project period? The Jordan River is not the only tributary to the lake - what loads of contaminants are the other tributaries carrying in the Weber, Bear and Ogden rivers? What about the sewer district loads up and down the Wasatch Front?

The issue of water re-use on the Jordan River has already been broached. Will water re-use cause a further concentration of wastes? What happens in the future if there are extremely low flows in the Jordan River? Will 2600 South sufficiently dilute the concentrates? Has the project considered the effects of the stated amount of discharged sulfate (22,000 tons of salts per year for 40 years) under various water-level scenarios?

The Farmington Bay Water Quality Working Group has not made any determinations on the impairment of beneficial uses in this embayment of the GSL. The study to determine if the bay is already polluted is currently underway. It makes sense that DWQ should not allow additional pollutants to be discharged into Farmington Bay of the Great Salt Lake until this study is completed.

Is this permit consistent with other state agency directives? There is not enough margin for error (.4ppb) to allow and account for probable dynamic river and lake changes over time. The state has not definitively answered the question as to the current possible pollution level of Farmington Bay - a question that should be answered before additional pollutants are added.

IV. Changed Public Perceptions - Community Standards

There is an embedded issue in the public reaction to this project. Though the discharges are legal under the current level of dilution and with the current discharge criteria, it doesn't fit the *community standards* for the Great Salt Lake environment.

We are part of a larger community which recognizes the value of the natural areas affected by this project. Because our community has spent a significant amount of funds, along with significant professional and volunteer effort to protect these areas, we are very concerned about the outcome of this project as well as the long-term implications of what we will allow to be discharged into the Great Salt Lake.

We now seem to be willing to downgrade this irreplaceable waterbody by accepting near-threshold pollution levels, approaching wildlife harm and mortality. In addition

to the public recreational and business/industry uses that have continued for 150 years, the public has found a greatly-increased appreciation in the last several decades for the wildlife and open space qualities of the lake and its tributaries.

V. Numeric Standards – Hasn't the Time Come?

A recurring theme in the discussion of this particular discharge proposal has been that no direct evidence has been presented that this discharge permit will cause harm or exceed acceptable limits of pollution within the river and lake. It is implied that the burden of proof for harm/no harm rests with the public, not the agencies who manage this resource for the public. Without the existence of clear numeric standards for protecting lake water quality, it is not possible to tell if this permit (or any other permit) is causing any harm or exceeding safe levels. It is also not possible to say that the permit is not causing harm. It's clear that the current "narrative" standards are not adequate to inform and assure the public that its resource is being protected rather than abused.

Though the state, through various agencies, is clearly responsible for managing the lake's tributaries and water, subsurface and significant adjacent wetlands and uplands, no state agency has stepped up to the challenge of tackling the difficult-but-necessary task of establishing clear numeric water quality standards for the Great Salt Lake , the state's premiere natural resource. Indeed, because issues overlap a number of different state agencies, there may even be conflicting decisions about the lake's future made within our single state structure.

Maintaining the health of the lake is a public trust responsibility the state carries for all citizens. We believe that it is time for the state to take concrete steps toward understanding our unique lake system, and, following appropriate scientific analysis, set clear, measurable numeric guidelines for its long term preservation. Until standards are in place, the public and the conservation community can probably be expected to recommend that the state err on the side of caution – and to oppose proposals that may have serious consequences for the lake's many public use and natural values.

The responsibility to gain the knowledge necessary to set scientifically credible numeric standards for the lake rests with the state, not its citizens or industries, and we encourage the state to clarify responsibilities within its own agencies and begin the process of setting numeric standards that will help to resolve conflict over future issues such as this. The Nature Conservancy would be a willing partner in this effort and would gladly help obtain whatever support we can for this key task.

VI. Beyond Numeric Standards – Lake Ecosystem Management

This proposal points out the inadequacy of "piecemeal" management of the Great Salt Lake system – the parceling out to different agencies responsibility for key lake functions (water quality, water quantity, wildlife, habitat management, extraction, etc.) The fact that DWQ is responsible for tracking discharge effects only on the water itself, is more than a minor dysfunction, as the discharge effects will ripple through the rest of the lake system without whole-picture coordination or analysis.

There are examples throughout the country where state and other agencies have decided that whole-system management of large-scale lake and waterbody ecosystems makes sense - and have then gone on to create the necessary management structures to accomplish their goals. We strongly urge the state to begin a process of analysis of an "ecosystem" approach to management of the entire Great Salt Lake system – and to move in the direction of creating a lake-wide governing entity that has the scientific information and the whole-system authority and vision to put proposals such as this in truly appropriate context.

The Great Salt Lake is more than the sum of its various management "parts". It is an international natural treasure that deserves to be studied and managed at the scale at which it operates – a rich, complex and interconnected large-scale lake system.

Selected References

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Cc:

Board and Staff
The Nature Conservancy of Utah

Governor Olene Walker
Office of the Governor
210 State Capitol
Salt Lake City, Utah 84114

Mr. Bob Morgan
Department of Natural Resources
1594 West North Temple, Suite 3710
Salt Lake City, UT 84114-5610

Mr. Don Ostler, Executive Secretary
Utah Water Quality Board
Cannon Building
288 North 1460 West
Salt Lake City, UT 84116

Mr. Joel Frandsen
Division of Forestry, Fire and State Lands
1594 W. North Temple, Suite 3520
P.O. Box 145703
Salt Lake City, UT 84114-5703

Mr. Kevin Conway
Division of Wildlife Resources
1594 W. North Temple, Suite 2110
P.O. Box 146301
Salt Lake City, UT 84114-6301

Mr. Larry Anderson
Division of Water Resources
1594 W. North Temple, Suite 310
P.O. Box 146201
Salt Lake City, UT 84114-6201

Lynn de Freitas, President
Friends of Great Salt Lake
P.O. Box 2655
Salt Lake City, UT 84110-2655

Governor's Office of Planning and Budget
116 State Capitol Building
Salt Lake City, UT 84114

Utah Environmental Congress
1817 S. Main
Salt Lake City, Utah 84115

Jeff Salt
Great Salt Lake Audubon
P.O. Box 522220
Salt Lake City, Utah 84152

Mayor Rocky Anderson
Lisa Romney
Salt Lake City Mayor's Office
451 South State, Room 306
Salt Lake City, 84111

Jon Cherry
Kennecott Utah Copper
P.O. Box 6001
Magna, Utah 84044-6001

Bruce Waddell
USFWS
2369 W. Orton Circle #50
West Valley City, Utah 84119

Ann Neville
Inland Sea Shorebird Reserve
Kennecott Utah Copper
P.O. Box 6001
Magna, Utah 84044

Wayne Martinson
National Audubon Society
549 Cortez Street
Salt Lake City, Utah 84103

Ella Sorensen
National Audubon Society
3868 Marsha Drive
West Valley City, Utah 84128

Cullen Battle
Fabian & Clendenin
P.O. Box 510210
Salt Lake City, Utah 84151

Joro Walker
Western Resource Advocates
1473 South 1100 East, Suite F
Salt Lake City, UT 84105

Rep. Brent Goodfellow
3620 South 6000 West
West Valley City, Utah 84128

Ivan Weber
Sierra Club
2120 South 1300 East, Suite 204
Salt Lake City, UT 84106-3785